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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.           | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------------|------------------|
| 10/747,907  | 12/29/2003  | Lim Ho Jeong         | 11037-208-999                 | 6805             |
| 24341   | 7590        | 09/28/2006           |                               |                  |
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|   |             |                      | EXAMINER<br>MERCADO, JULIAN A |                  |
|   |             |                      | ART UNIT                      | PAPER NUMBER     |
|   |             |                      | 1745                          |                  |

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/747,907

**Applicant(s)**

JEONG, LIM HO

**Examiner**

Julian Mercado

**Art Unit**

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>2006-05-22, 2003-12-29</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The Information Disclosure Statement filed on 2006-05-22 and 2003-12-29 have been considered by the examiner.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the withdrawn coolant" in the last line thereof. There is insufficient antecedent basis for this limitation in the claim.

Claim 1 at line 1 recites in its preamble "[a] cooling system for a fuel cell." However, the recited components comprising a fuel gas flow field and air flow field are not considered part of the cooling system of the fuel cell *per se*. Thus, the scope of the claim is indefinite. The examiner notes, however, that rewriting claim 2 in independent form by incorporating the subject matter of claim from which it presently depends brings breadth and scope to the presently claimed cooling system in its recitation of at least one cooling pipe in each of the fuel gas flow field, air flow field and coolant circulation flow field. (that is, the subject matter of claim 2

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makes clear as to how the fuel gas flow field and anode flow field may comprise a part of a cooling system)

Claims 2-4 are rejected under 35 U.S.C. 112, second paragraph, as being dependent upon a rejected base claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Shimanuki et al. (JP 2002-216816)

For purposes of detailed discussion the examiner relies on the machine translation of the abovesited document available online from [http://www.ipdl.ncipi.go.jp/homepg\\_e.ipdl](http://www.ipdl.ncipi.go.jp/homepg_e.ipdl).

Shimanuki et al. teaches a cooling system for a fuel cell vehicle comprising a fuel gas and air flow field supplied by hydrogen supply system [4] and air supply system [2], respectively, and which are pressurized by pumps [2C] and [4B], and which exhaust the fuel gas and air from the stack through air excretory system [3] and hydrogen gas excretory system [5]. See par. [0016] The examiner notes that the instant accumulators through which the air and fuel are exhausted have been given its broadest reasonable interpretation insofar as the claims do not recite the collected gases as being, e.g. recycled or reused. Rather, the claims merely recite that the collected gases are immediately purged or exhausted, which Shimanuki et al. clearly performs.

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A coolant circulation flow field [6] cools the fuel cell by heat transfer to heat exchanger or radiator [6A]. See par. [0026]

Claims 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Takeu (JP 62-268062)

At the outset, it is noted that claim 5 recites in its preamble “[a] pipe...”, thus, the claimed fuel gas flow field, air flow field, coolant circulation flow field, air accumulator, pump and radiator have not been given patentable weight, as these features are more properly limiting towards a fuel cell system. To this extent, Takeu teaches a “cooling pipe” [20] having a plurality of streamlined fins on its circumferential surface. See the abstract and Figure 1. Figure 2 is asserted to show a wave-shaped circumferential surface.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimanuki et al. in view of Takeu and Okamoto (U.S. Pat. 6,214,486).

The teachings of Shimanuki et al. are discussed above.

Shimanuki et al. does not explicitly teach each of a fuel gas flow field, air flow field and coolant circulation flow field being formed with at least one cooling pipe having a plurality of

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fins on a circumferential surface thereof. However, as discussed above, Takeu teaches a cooling pipe [20] for a coolant circulation flow field having a plurality of streamlined fins on its circumferential surface. Thus, the skilled artisan would find obvious to modify Shimanuki et al.'s invention by employing a cooling pipe. The motivation for such a modification would be to increase the cooling efficiency of the fuel cell. See Takeu, Abstract.

As to the fuel gas flow field and air flow field being formed with at least one cooling pipe, Okamoto teaches that both the fuel gas flow field and air flow field are desirably uniformized in temperature, see col. 4 lines 16-44 as follows:

... the efficiency of heat exchange between the oxygen containing gas and the cooling medium is increased for uniformizing the temperature...

Similarly, the temperature of an electric generation section can be uniformized by the fuel gas flowing through the second gas passage and the cooling medium.

Thus, the skilled artisan would find obvious to further modify Shimanuki et al.'s invention by employing a cooling pipe in the fuel gas flow field and air flow field in order to increase the cooling efficiency of the fuel cell. See Takeu, Abstract, and Okamoto, ib.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. 2,540,339 to Kritzer teaches a cross-finned heat exchange pipe.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



jam



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SUPERVISORY PATENT EXAMINER